

Chemistry I: Titration Problem Answers

1. 8.0 M

$$(1 \text{ H}^+)(50 \text{ mL})(x) = (1 \text{ OH}^-)(4.0 \text{ M})(100 \text{ mL})$$

2. 1.125 M

$$(2 \text{ H}^+)(80 \text{ mL})(x) = (1 \text{ OH}^-)(3.00 \text{ M})(60 \text{ mL})$$

3. 1.5 mL KOH

$$(3 \text{ H}^+)(20 \text{ mL})(0.01 \text{ M}) = (1 \text{ OH}^-)(0.40 \text{ M})(x \text{ mL})$$

4. 2.84 M NaOH

$$(1 \text{ H}^+)(28.4 \text{ mL})(1 \text{ M}) = (1 \text{ OH}^-)(x \text{ M})(10.0 \text{ mL})$$

5. 0.066 M

$$(1 \text{ H}^+)(21 \text{ mL})(0.1 \text{ M}) = (1 \text{ OH}^-)(x \text{ M})(32 \text{ mL})$$

6. 1600 mL

$$(1 \text{ H}^+)(x \text{ mL})(0.1 \text{ M}) = (2 \text{ OH}^-)(0.2 \text{ M})(400 \text{ mL})$$

7. 0.14 M

$$(1 \text{ H}^+)(14 \text{ mL})(0.2 \text{ M}) = (1 \text{ OH}^-)(x \text{ M})(20 \text{ mL})$$

8. 8.55 g Ba(OH)₂

$$(2 \text{ H}^+)(48 \text{ mL})(0.15 \text{ M}) = (2 \text{ OH}^-)(x \text{ M})(144 \text{ mL})$$

$$0.05 \text{ M} = \left(\frac{\frac{x}{171 \text{ g}}}{1 \text{ L}} \right)$$

9. 0.80 M

$$(1 \text{ H}^+)(100 \text{ mL})(x \text{ M}) = (1 \text{ OH}^-)(.80 \text{ M})(100 \text{ mL})$$

10. 4.62 g

$$(0.30 \text{ L}) \left(\frac{.03 \text{ mol H}_3\text{PO}_4}{1 \text{ L}} \right) \left(\frac{3 \text{ mol Ba(OH)}_2}{1 \text{ mol H}_3\text{PO}_4} \right) \left(\frac{171 \text{ g Ba(OH)}_2}{1 \text{ mol Ba(OH)}_2} \right) = 4.62 \text{ g Ba(OH)}_2$$

11. 31.25 mL

$$(1.5 \text{ g NaOH}) \left(\frac{1.0 \text{ mol NaOH}}{40 \text{ g NaOH}} \right) \left(\frac{1 \text{ mol H}_3\text{PO}_4}{3 \text{ mol NaOH}} \right) \left(\frac{1 \text{ L}}{0.4 \text{ mol H}_3\text{PO}_4} \right) \left(\frac{1000 \text{ mL}}{1 \text{ L}} \right) = 31.25 \text{ mL}$$

12. 2.64 M NH_4OH

$$(1 \text{ H}^+)(26.4 \text{ mL})(1 \text{ M}) = (1 \text{ OH}^-)(x \text{ M})(10 \text{ mL})$$

$$2.64 \text{ M NH}_4\text{OH} = \left(\frac{\left(\frac{x \text{ g}}{35 \text{ g}} \right)}{1L} \right) = 92.5 \text{ g NH}_4\text{OH}$$

13. SKIP